SABANCI UNIVERSITY - FACULTY OF ENGINEERING AND NATURAL SCIENCES
Materials Science and Nano Engineering - Recommended Course Program

Year -1 Freshman — Semester-1

Course Code	Course Name	Course Type	Prerequisite Courses	SU Credits	Engineering Credits (ECTS)	Basic Science Credits (ECTS)	ECTS (Total)
MATH101	Calculus I	University C.		3		6	6
NS101	Science of Nature I	University C.		4		6	6
CIP101N	Civic Involvement Projects I	University C.		0			1
HIST191	Principles of Atatürk and the History of the Turkish Revolution I	University C.		2			3
SPS101	Humanity and Society I	University C.		3			6
TLL101	Turkish Language and Literature I	University C.		2			3
IF100	Computational Approaches to Problem Solving	University C.		3	5		5
*PROJ 201	*Undergraduate Project Course			1			1
			TERM TOTAL	18	5	12	31

The students have to take *Undergraduate Project Course (PROJ 201) on freshman or sophomore year.

Year -1 Freshman — Semester-2

Course Code	Course Name	Course Type	Prerequisite Courses	SU Credits	Engineering Credits (ECTS)	Basic Science Credits (ECTS)	ECTS (Total)
MATH102	Calculus II	University C.		3		6	6
NS102	Science of Nature II	University C.		4		6	6
AL102	Academic Literacies	University C.		3			5
HIST192	Principles of Atatürk and the History of the Turkish Revolution II	University C.		2			3
SPS102	Humanity and Society II	University C.		3			6
TLL102	Turkish Language and Literature II	University C.		2			3
*PROJ 201	*Undergraduate Project Course			1			1
			TERM TOTAL	17	0	12	29

The students have to take *Undergraduate Project Course (PROJ 201) on freshman or sophomore year.

Year - 2 Sophomore — Semester-3

Course Code	Course Name	Course Type	Prerequisite Courses	SU Credits	Engineering Credits (ECTS)	Basic Science Credits (ECTS)	ECTS (Total)
*PROJ 201	*Undergraduate Project Course			1	1		1
ENS 205	Introduction to Materials Science	required		3	4	2	6
ENS 202	Thermodynamics	required	NS 102	3	3	3	6
CHEM 212	General Chemistry for Engineers	required		3		6	6
MATH 203	Introduction to Probability	core		3		6	6
Elective	Elective	elective		3			6
Elective	Elective	elective		3			6
			TERM TOTAL	18	7	17	36

The students have to take *Undergraduate Project Course (PROJ 201) on freshman or sophomore year.

Year - 2 Sophomore — Semester-4

Course Code	Course Name	Course Type	Prerequisite Courses	SU Credits	Engineering Credits (ECTS)	Basic Science Credits (ECTS)	ECTS (Total)
*PROJ 201	*Undergraduate Project Course			1			1
MAT 204	Electronic, Optical and Magnetic Properties of Materials	required	MATH 101 + NS 101	3	2	4	6
NS 218	Fundamentals of Nanoscience	required	ENS 202	3	2	4	6
MATH 212	Linear Algebra and Differential Equations	required		4		6	6
PHYS 113	Basic Concepts of Physics for Scientists and Engineers	required		3		7	7
MAT 206	Kinetics of Materials	core	ENS 202 + ENS 205	3	5	1	6
ENS 209	Intro to Comp. Aided Modeling	core		3	5	1	6
			TERM TOTAL	19	14	23	37

The students have to take *Undergraduate Project Course (PROJ 201) on freshman or sophomore year.

Year - 3 Junior — Semester-5

Course Code	Course Name	Course Type	Prerequisite Courses	SU Credits	Engineering Credits (ECTS)	Basic Science Credits (ECTS)	ECTS (Total)
MAT 312	Materials Characterization	required	ENS 202 & MAT 204 & ENS 205	4	7		7
MAT 314	Mechanical Prop. of Materials	required		3	4	1	5
MAT 305	Polymer Engineering I	core		3	4	1	5
Elective	Elective	elective		3	6		6
Elective	Elective	elective		3	6		6
			TERM TOTAL	16	27	2	29
MAT 395	Internship Project	required		0	5	0	5

Year - 3 Junior — Semester-6

Course Code	Course Name	Course Type	Prerequisite Courses	SU Credits	Engineering Credits (ECTS)	Basic Science Credits (ECTS)	ECTS (Total)
MAT 306	Computational Techniques for Materials at the Nanoscale	required		3	4	2	6
MAT 307	Composite Materials	core	ENS 204	3	7	0	7
MAT 308	Phase Equilibria	core		3	4	1	6
MAT 302	Polymer Chemistry	core		4	2	5	7
Elective	Elective	elective		3			6
			TERM TOTAL	16	17	8	32

Year - 4 Senior — Semester-7

Course Code	Course Name	Course Type	Prerequisite Courses	SU Credits	Engineering Credits (ECTS)	Basic Science Credits (ECTS)	ECTS (Total)
ENS 491	Graduation Project	required	MAT 314 or MAT 312	1	2	0	2
MAT 401	Surface Science	core	NS 218	3	2	4	6
MAT 408	Intro. To Ceramic Materials	core	MAT 308 MAT 204 ENS 202 ENS 205	3	4	1	5
Elective	Elective	elective		3			6
Elective	Elective	elective		3			6
			TERM TOTAL	13	8	5	25

Year - 4 Senior — Semester-8

Course Code	Course Name	Course Type	Prerequisite Courses	SU Credits	Engineering Credits (ECTS)	Basic Science Credits (ECTS)	ECTS (Total)
ENS 492	Graduation Project (Implementation)	required	ENS 491	3	5	0	5
MAT 406	Introduction to Nanoscience/Fundamentals of Nanoengineering	core	NS 218	3	5	0	5
Elective	Elective	elective		3			6
Elective	Elective	elective		3			6
Elective	Elective	elective		3			6
			TERM TOTAL	15	10	0	28

				SU CREDITS TOTAL	132		
	Engineering	93	Science	79	ECTS CREDITS TOTAL	252	The minimum ECTS requirement for graduation is 240 ECTS.

*PROJ 201 is displayed in multiple semesters only to indicate possible enrollment periods. This course is taken only once, and its credit is counted only once toward the graduation requirements.

TRACK ELECTIVE COURSES

Description: These tracks are not official specializations; they are suggested course groupings for students who wish to focus on a particular area within Materials Science and Nano Engineering. The lists include selected MAT-coded and related core/elective courses. Required core courses for the program and special topics courses are not included.

1. Materials Science and Nano Engineering Suggested Courses for "Inorganic Materials Processing and Properties" Track

Course Code	Course Name	Suggested term	Prerequisite	SU Credits	ECTS
CS 201	Introduction to Computing	Fall		3	6
MAT 206	Kinetics	Spring	ENS 202 + ENS 205	3	6
MAT 308	Phase Equilibira	Spring		3	5
MAT 309	Transport Phenomena in Materials	Fall		3	6
MAT 401	Surface Science	Fall	NS 218	3	6
MAT 405	Advanced Materials Charac.	Fall		3	7
MAT 406	Nanoengineered Systems Fabrication	Spring	NS 218	3	5
MAT 408	Intro. To Ceramic Materials	Spring	MAT 308 MAT 204 ENS 202 ENS 205	3	5
MAT 422	Glass Science and Technology	Spring	ENS 205; ENS 202	3	6
MAT 424	Materials Selection in Product Design	Spring	ENS 205 ; ENS 202	3	6
EE 307	Semiconductor Physics and Devices	Fall	ENS 203	3	6
	Total credits			33	64

2. Materials Science and Nano Engineering Suggested Courses for "Polymers and Biological Materials" Track

Course Code	Course Name	Suggested term	Prerequisite	SU Credits	ECTS
CS 201	Introduction to Computing	Fall		3	6
NS 207	Organic Chemistry	Fall		4	7
MAT 302	Polymer Chemistry	Spring		4	7
MAT 305	Polymer Engineering I	Fall		3	5
MAT 402	Polymer Engineering II	Spring	ENS 205	3	6
MAT 404	Polymer Physics	Spring	ENS 205	3	5
BIO 321	Biochemistry I	Fall	NS 201 + NS 207	4	7
BIO 466	Biophysics: Molecules and Systems	Spring/Fall		3	5
ENS 222	Biological Circuits and Molecular Machines	Spring/Fall		3	6
MAT 401	Surface Science	Fall	NS 218	3	6
MAT 416	Biomaterials Science and Biocompatibility	Spring		3	5
MAT 307	Composite Materials	Fall/Spring	ENS 204	3	6
	Total credits			39	71

3. Materials Science and Nano Engineering Suggested Courses "Structural Materials and Processing" Track

Course Code	Course Name	Suggested term	Prerequisite	SU Credits	ECTS
ENS 204	Mechanics	Fall	NS 101 + MATH 102	3	6
MAT 309	Transport Phenomena in Materials	Fall		3	6
MAT 305	Polymer Engineering I	Fall		3	5
MAT 307	Composite Materials	Spring	ENS 204	3	6
ME 301	Mechanical Systems	Fall		3	6
IE 309	Manufacturing Processes	Fall		3	6
IE 402	Integrated Manufacturing Systems	Spring/Fall		3	6
IE 416	Additive Manufacturing	Spring/Fall		3	6
MAT 402	Polymer Engineering II	Spring	ENS 205	3	6
ME 302	Mechanical Systems II	Spring	ME 301	3	6
ME 303	Control System Design	Spring/Fall		3	6
ME 415	Computational Analysis & Simulation	Spring/Fall		3	6
MAT 48004	Polymer Matrix Composites	Spring/Fall	NS 207; MAT 305; MAT 307	3	6
	Total credits			**39**	**77**

4. Materials Science and Nano Engineering Suggested Courses for "Electronic Materials" Track

Course Code	Course Name	Suggested term	Prerequisite	SU Credits	ECTS
ENS 203	Introduction to Circuits I	Fall		3	6
EE 307	Semiconductor Physics and Circuits	Fall	ENS 203	3	6
MAT 308	Phase Equilibria	Spring		3	5
PHYS 302	Solid State Physics	Fall	PHYS 303	3	6
PHYS 303	Quantum Mechanics I	Fall	NS 102 + MATH 102	3	6
ME 402	Plasmonics	Fall		3	6
EE 407	Microelectronic Fabrication	Spring/Fall		3	6
EE 408	Modeling of Semiconductor Devices	Spring/Fall		3	6
ENS 201	Electromagnetism	Spring/Fall		3	6
NS 214	Waves, Oscillation and Optics	Spring/Fall		3	6
PHYS 492	Modern Topics in Condensed Matter Physics	Spring/Fall		3	6
	Total credits			**33**	**65**

5. Suggested Courses for Materials Science and Nano Engineering and "Manufacturing and Design" Track

Course Code	Course Name	Suggested term	Prerequisite	SU Credits	ECTS
ENS 209	Intro to Comp. Aided Modeling	Fall/Spring		3	6
IE 309	Manufacturing Processes I	Fall		3	6
MAT 307	Composite Materials	Fall/Spring	ENS 204	3	6
MAT 424	Materials Selection in Product Design	Spring	ENS 205	3	6
MAT 402	Polymer Engineering 2	Spring	ENS 205	3	6
VA 201	Visual Language 1	Spring/Fall		3	6
VA 202	Visual Language 2	Spring/Fall	VA 201	3	6
MAT 48004	Polymer Matrix Composites	Spring/Fall	NS 207; MAT 305; MAT 307	3	6
ENS 410	Advanced Solid Modeling Techniques	Spring/Fall	ENS 209	3	6
IE 402	Inegrated Manufacturing Systems	Spring/Fall		3	6
IE 416	Additive Manufacturing	Spring/Fall		3	6
IF 402	Sustainability and Circularity in Materials	Spring/Fall		3	6
VA 405	Physical Computing	Spring/Fall		3	6
MGM 402	Entrepreneurship	Spring/Fall		3	6
	Total credits			**42**	**84**

MINOR PROGRAMS

DESCRIPTIONS: To earn the Minor Certificate, requireduired must be completed and course(s) must be selected from the Elective Courses group.

Suggested for Elective Courses

Course Code	Course Name	SU Credits	ECTS	Prerequisite
Chemistry Minor				
CHEM 202	Chemical Kinetics	3	7	
CHEM 301	Inorganic Chemistry	3	6	
CHEM 302	Analytical Chemistry	3	7	
CHEM 405	Electrochemistry	3	6	
NS 207	Organic Chemistry	4	7	
Physics minor				
PHYS 302	Solid State Physics	3	6	PHYS 303
PHYS 303	Quantum Mechanics 1	3	6	NS 102
PHYS 304	Quantum Mechanics 2	3	6	PHYS 303
PHYS 401	Classical Mechanics	3	6	
PHYS 211	Modern Physics	3	6	NS 101
Energy Minor				
CHEM 405	Electrochemistry	3	6	
ENS 202	Thermodynamics	3	6	NS 102
ENS 207	Introduction to Energy Systems	3	6	
ENS 315	Energy	3	6	
ME 309	Heat and Mass Transport	3	6	ME 307